Tracheotomy in a Case of Tracheobronchitis Secondary to Influenza

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ALTHOUGH DEATHS from secondary infection within the chest were less prevalent during the recent Asian influenza epidemic than was the case during the pandemic of 1918-1919, the number of patients who died of that cause was still considerable. According to Herrmann and co-workers,[1] laryngeal, tracheal and bronchial inflammatory changes in 23 patients who died during the recent epidemic were greater than is usual in patients who die suddenly of acute respiratory inflammation before medical attention can be provided.

Nothing could be found in the literature on the use of tracheotomy in patients with severe tracheobronchitis complicating influenza. In the case here presented, the procedure probably was life-saving.

CASE REPORT

The patient, a 71-year-old white man, was admitted to Santa Teresita Hospital in Duarte on January 16, 1958, with high fever, severe dyspnea and a dry cough. A few days previously, the patient's wife had had "flu"; and the description of her illness was consistent with this diagnosis. Two days before admission, the patient had developed fever, a nonproductive cough, sore throat and headache. Self-medication with aspirin afforded no relief. The following day he became much worse. The temperature rose to 104°F., nausea and vomiting (without hematemesis) developed, and the patient became mentally confused and very dyspneic.

Ten years previously the patient had had symptoms suggestive of myocardial infarction. At that time he was confined to bed for several months and retired from work. The patient said that the final diagnosis was "myocardial instability." Bilateral inguinal herniorrhaphy and left orchidectomy had been done three years before the present illness without complication. The patient denied any history of respiratory infection, productive cough or abnormality in x-ray films of the chest. He had smoked three packages of cigarettes daily for approximately fifty years, but he quit completely at the time of the cardiac episode.

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Upon physical examination the patient was observed to be acutely ill and moderately dyspneic. Well developed and well nourished, he appeared somewhat younger than his stated age. The oral temperature was 102°F., the pulse rate 84 and respirations 38 a minute. He was somewhat confused and apprehensive, and his breathing was more labored than would seem necessary, for his color was good. The skin was hot and dry. Bilateral grade 3 arcus senilis was noted but the pupils were round and equal in size, and they reacted normally to light. The patient had complete dentures. The oral pharynx was moderately red. The chest was somewhat increased in the postero-anterior diameter, but there was normal expansion for a patient of this age. The lung fields were resonant throughout. Moist sticky rales were heard over the right middle lobe. Blood pressure was 160/80 mm. of mercury and the pulse was regular. No cardiac enlargement, murmurs, or gallops were noted. The heart tones were of good quality. The spleen and liver were not enlarged. Knee jerks were absent but the Babinski reflex was not evoked. No cyanosis, clubbing or edema was noted.

The hemoglobin content was 15.4 gm. per 100 cc. of blood. Leukocytes numbered 11,000 per cu. mm. —90 per cent neutrophils, 8 per cent lymphocytes and 2 per cent monocytes. The specific gravity of the urine was 1.021 and the reactions for albumin and sugar were negative. Microscopic examination of the urine showed 8 to 10 pus cells per high power field, 2 to 30 hyaline casts and a heavy shower of coarse granular casts. The results of serologic tests were negative for syphilis. An electrocardiogram two days after admittance was normal except for sinus tachycardia and nonspecific ST depression.

A diagnosis of influenza complicated by pneumonia was made, and the patient was treated with rest in bed, large doses of aspirin, oxygen by mask and chlorpromazine to control nausea, vomiting and anxiety. X-ray examination of the chest (Figure 1) showed mild homogeneous increase in density throughout the right middle lobe, which was interpreted as pneumonitis. The rectal temperature dropped to normal during the night but rose to 102°F. the following afternoon. Although fewer rales were noted over the right lung at this time and the patient appeared less dyspneic, treatment with chloramphenicol was begun. The dosage was 0.25 gm. every six hours, and the temperature be-

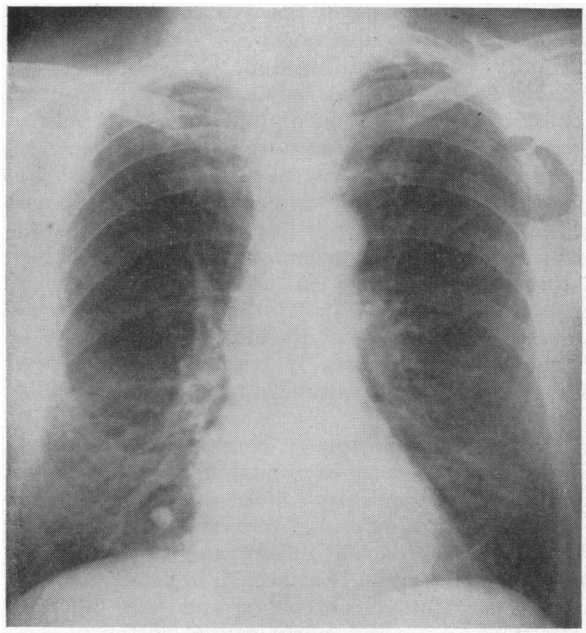

Figure 1.—X-ray film showing mild increase in density throughout right middle lobe, interpreted as pneumonitis.

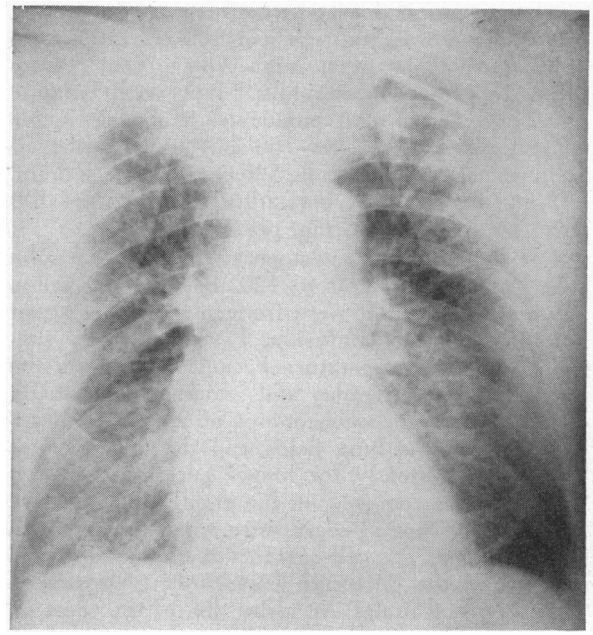

Figure 2.—X-ray film taken after tracheotomy, interpreted as showing generalized bronchopneumonia, both lungs.

came normal on the fourth day of therapy. An x-ray film then showed almost complete resolution of the previously noted pneumonitis. As the number of leukocytes had decreased to 3,500 per cu. mm., chloramphenicol was discontinued January 20.

The patient remained afebrile for the next few days, but oxygen was continued because of obvious dyspnea. During this period an increasing number of coarse rhonchi were heard over both lung fields, but the patient was unable to expectorate much sputum. Because bronchospasm was considered as a possible cause of dyspnea, intermittent positive pressure was tried in conjunction with inhalation of nebulized solutions of superinone (Alevaire) and isoproterenol hydrochloride (Isuprel). Aminophylline also was administered by injection and per rectum. Neither these measures nor increasing hydration with intravenous fluids loosened the material in the bronchi. To control the bronchitis, tetracycline, 250 gm. every six hours, was begun on January 22, but the course of the illness was not altered. Congestive failure was not a factor in the dyspnea, for it was not relieved by therapeutic trial of meralluride sodium (Mercuhydrin) 2 cc. intramuscularly, which resulted in only mild diuresis.

It was assumed that if the thick mucus in the patient's bronchi could be loosened or aspirated satisfactorily, dyspnea probably would be relieved. The possibility of bronchoscopy was considered but rejected because obviously it could be of only temporary benefit and could not be repeated often enough to keep the bronchi cleared. Tracheotomy seemed the obvious method of choice, but as the patient was afebrile and still apparently in good general condition, there was no clear indication for it.

Early on the morning of the eleventh day, the patient's condition suddenly became worse. The systolic blood pressure dropped to 102 mm. of mercury and cyanosis appeared. The pulse rate was 140, and the temperature reached 104°F. Obviously, respiration had to be improved quickly. After rapid digitalization a tracheotomy tube was inserted under local anesthesia and the trachea and large bronchi were cleared by suction. A specimen of the material removed was taken for microscopic examination and culture. Within a few minutes, cyanosis decreased and other signs of decided clinical improvement were noted, although an x-ray film of the chest taken the day after tracheotomy was interpreted as showing bronchopneumonia generalized throughout both lungs (Figure 2).

At first, aspiration was necessary every few minutes to remove large quantities of very tenacious and ropy sputum from the trachea and major bronchi; but as the patient's condition improved, the sputum decreased in quantity. Each aspiration was followed by immediate lessening of dyspnea.

Immediately after the placement of the tube and before reports on the sputum studies were received, penicillin, streptomycin and chloramphenicol were administered. On microscopic examination of the sputum many large, Gram-positive cocci were seen in pairs and in tetrads. Culture of the material grew Staphylococcus aureus, coagulase positive. Except for a slight sensitivity to neomycin and a tetracycline-novobiocin combination (Panalba) these bacteria were highly resistant to all antibiotics. When the results of the sensitivity studies were known (the day after operation) Panalba therapy was added.

At the time of operation the hemoglobin content of the blood was 13.6 gm. per 100 cc. Leukocytes numbered 9,900 per cu. mm.—78 per cent neutrophils, 1 per cent eosinophils, 14 per cent lymphocytes and 7 per cent monocytes. Carbon dioxide content was 75 mg. per 100 cc.; bicarbonate, 74 volumes per cent; chloride, 526 per 100 cc.; sodium, 294 mg. per 100 cc.; potassium, 15.5 mg. per 100 cc.; urea nitrogen, 13 mg. per 100 cc.

For the first three postoperative days, the pulse rate ranged from 100 to 120, episodes of gallop rhythm of the heart were frequent and the patient showed moderate confusion. Fever gradually subsided and the temperature became normal on the fourth postoperative day and remained normal. By the fifth day after tracheotomy, all rales had disappeared from the lung fields and the opening was closed intermittently for longer periods each day. The tube was removed on the eighth postoperative day, and the wound edges were approximated with adhesive tape. The cell contents of the blood on the eighth and the thirteenth postoperative days were within normal limits. An x-ray film of the chest on February 12 (the seventeenth postoperative day) showed almost complete resolution of the bronchopneumonia.

On February 13 the spleen was palpated and bacterial endocarditis was suspected, but a culture of the blood and the subsequent clinical course did not support the suspicion. On February 14, the patient felt so well that he demanded immediate discharge. He was permitted to return home, and when seen in the office a week later he said that for a few days after discharge from the hospital his memory had been poor but later had returned to normal. Except for some paleness, the patient appeared in good health. The lungs were clear to percussion and auscultation. A specimen of blood was obtained on February 21 and complement-fixation (performed by the Los Angeles City Department of Health) showed that Influenza A titer was greater than 1:1024 and Influenza B titer was less than 1:8.

DISCUSSION

The high titer of antibodies to Influenza A and the classical clinical course of the illness in this patient during a known epidemic of influenza constitute fairly conclusive evidence that the primary illness was influenza. However, whatever the cause, similar clinical conditions—that is, thick, tenacious mucus which cannot be raised by other methods and is causing the patient respiratory embarrassment—should be recognized as an indication for bronchoscopy and possibly tracheotomy.

Nelson and Bowers[2] recently published a report of 310 cases in which tracheotomy was employed. Although in all the earlier cases of the series (1947) the procedure was performed because of mechanical ventilatory obstruction, by 1955 some 77 per cent of the tracheotomies were done because of secretional ventilatory obstruction. These investigators suggested that tracheotomy should be used more widely, but in none of the 310 cases included in their report was the operation done because of primary pulmonary infection. Of course, tracheotomy is employed in acute laryngotracheobronchitis of infants and in diphtheria, but in both of these conditions the procedure is used because of an upper tracheal or laryngeal block. In the case discussed in this report, tracheotomy was performed primarily to make it possible to aspirate the mucus which blocked the trachea and bronchi and which already had resulted in extensive bronchopneumonia; the increase in vital capacity through decrease in dead space above the tracheotomy was of secondary importance. If tracheotomy had been done earlier, perhaps bronchopneumonia could have been avoided.

As was stated previously, Herrmann and co-workers,[1] in postmortem examination of patients who had died of respiratory failure associated with the Asian influenza epidemic, observed that laryngeal, tracheal and bronchial inflammatory changes were greater than were to be expected. In some cases, the entire laryngotracheobronchial tree was inflamed, and thick, semi-solid mucus caused partial to complete obstruction. In the majority of cases excessive secretions, often thick, ropy and tenacious, were noted. These conditions were quite similar to those in the present case. On admission to hospital the patient recovered rather quickly from pneumonitis but then tracheobronchitis gradually developed and accumulation of thick, tenacious mucus resulted in bronchopneumonia—very likely by blockage of the smaller bronchi. Death was prevented by aspirating this thick mucus, which the patient had been unable to cough up.

The question as to when tracheotomy should be done in pulmonary infection is primarily a clinical one. In any patient who has severe bronchitis with thick mucus which cannot be raised by the usual measures, if the clinical course is becoming worse despite adequate antibiotic administration, the use of tracheotomy should be considered.

SUMMARY

A case of influenza complicated by tracheobronchitis and bronchopneumonia in a 71-year-old man is described. Tracheotomy was performed and made possible satisfactory aspiration of the trachea and major bronchi, thereby saving the patient's life.

Tracheotomy should be considered in all cases of severe tracheobronchitis when response to the usual treatment is not satisfactory.

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